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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/898,321	07/02/2001	Robert A. Street	A0682	4769

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EXAMINER
BROCK II, PAUL E

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 11/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/898,321	STREET ET AL.	
	Examiner	Art Unit	
	Paul E Brock II	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 July 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to because in figure 3 it appears that reference numerals 346 and 348 should be pointing to opposite features (i.e. 346 is pointing to the feature 348 is disclosed as depicting, and visa versa). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 – 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley et al. (USPAT 5587591) in view of Kunikiyo (USPUB 2002/0135041).

With regard to claim 1, Kingsley discloses in figures 1b – 2b an integrated circuit. Kingsley discloses in figures 1b – 2b a plurality of pixel circuits (134) arranged in rows and columns. Kingsley discloses in figures 1b – 2b a plurality of first lines (132), each first line connected to a corresponding column of pixel circuits. Kingsley discloses in figures 1b – 2b a

plurality of second lines (131), each second line connected to a corresponding row of pixel circuits. Kingsley discloses in figure 2b wherein the plurality of first lines are formed such that each first line extends over the plurality of second lines at corresponding crossover locations. Kingsley discloses in figure 2a where an insulator is defined at each crossover location that separates each first line from the plurality of second lines. Kingsley does not disclose that the insulator is an air-gap. Kunikiyo teaches in figures 12 and 13, and paragraph 0119 wherein an air-gap (200) is defined at each crossover location that separates a first line (53) from the plurality of second lines (52). It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the air gap of Kunikiyo in the device of Kingsley in order to reduce the capacitance between the lines as taught by Kunikiyo in paragraph 0119.

With regard to claim 2, Kingsley discloses in figures 1b – 2b wherein each pixel circuit includes an access transistor (134) and a pixel element (120), wherein the access transistor includes a gate terminal connected (136) to an associated first line, a first terminal (137) connected to the pixel element, and a second terminal (138) connected to an associated second line.

With regard to claim 3, Kingsley discloses in figures 1b – 2b, column 4, lines 57 – 67 and column 5, lines 1 – 3 wherein the access transistor comprises amorphous silicon.

With regard to claim 6, Kingsley discloses in column 1, lines 9 – 16 wherein the integrated circuit comprises a medical image sensor array.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley and Kunikiyo as applied to claims 1 and 2 above, and further in view of Akiyama et al. (USPAT 5712494, Akiyama).

With regard to claim 4, it is not clear if Kingsley and Kunikiyo disclose wherein the access transistor of each pixel circuit comprises a self-aligned thin-film transistor. Akiyama teaches in figures 1a – 1d wherein an access transistor of an each pixel circuit comprises a self-aligned thin-film transistor. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the self-aligned thin-film transistor of Akiyama in the device of Kingsley and Kunikiyo in order to use a thin film field effect transistor which can be operated at high speed even if a channel length is shortened.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley and Kunikiyo as applied to claims 1 and 2 above, and further in view of Hwang et al. (USPAT 6337284, Hwang).

With regard to claim 5, Kingsley and Kunikiyo do not teach wherein each of the plurality of pixel circuits also comprises a charge sensing region that is separated from the associated second line by a buried insulator layer comprising a resin derived from 2-staged bisbenzocyclobutene monomers. Hwang teaches in figures 1 – 2d and column 2, lines 15 – 24 wherein each of the plurality of pixel circuits also comprises a charge sensing region that is separated from the associated second line by a buried insulator layer comprising a resin derived from 2-staged bisbenzocyclobutene monomers. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the bisbenzocyclobutene of Hwang in

the device of Kingsley and Kunikiyo in order to take advantage of the high dielectric constant, high moisture resistance and high resistance to electrical breakdown of bisbenzocyclobutene.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley and Kunikiyo as applied to claims 1 and 2 above, and further in view of Street (USPAT 5789737).

With regard to claim 7, Kingsley discloses in column 3, lines 62 – 67 wherein each pixel element comprises an amorphous silicon sensor. Kingsley and Kunikiyo do not teach wherein each pixel circuit further comprises a phosphor converter located over the amorphous silicon sensor. Street teaches in column 1, lines 11 – 27 wherein each pixel element comprises an amorphous silicon sensor, and wherein each pixel circuit further comprises a phosphor converter located over the amorphous silicon sensor. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the phosphor converter of Street in the device of Kingsley and Kunikiyo in order to convert incoming x-rays to light rays.

7. Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al. (USPAT 5623161, Fukuda) in view of Kunikiyo.

With regard to claim 8, Fukuda discloses in figures 1 and 2 an image sensor array. Fukuda discloses in figures 1 and 2 and column 4, lines 57 – 67 a plurality of pixel circuits arranged in rows and columns, each pixel circuit including an access transistor (1). Fukuda discloses in figures 1 and 2 a plurality of gate lines (10), each gate line connected (9) to the access transistors of a corresponding column of pixel circuits. Fukuda discloses in figures 1 and 2 a plurality of data lines (12), each data line connected (11) to the access transistors of a

corresponding row of pixel circuits. Fukuda discloses in figures 1 and 2 wherein the plurality of data lines are formed such that each data line overlaps the plurality of gate lines at corresponding crossover locations. Fukuda discloses in figures 1 and 2 where an insulator (3) is defined at each crossover location that separates each data line from the plurality of gate lines. Fukuda does not disclose that the insulator is an air-gap. Kunikiyo teaches in figures 12 and 13, and paragraph 0119 wherein an air-gap (200) is defined at each crossover location that separates a data line (53) from the plurality of gate lines (52). It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the air gap of Kunikiyo in the device of Fukuda in order to reduce the capacitance between the lines as taught by Kunikiyo in paragraph 0119.

With regard to claim 10, Kunikiyo teaches in figures 12 and 13 further comprising a strengthening insulator (58) formed on the plurality of data lines at the crossover locations.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda and Kunikiyo as applied to claim 8 above, and further in view of Antonuk et al. (USPAT 5262649, Antonuk).

With regard to claim 9, Fukuda discloses in figures 1 and 2 and column 5, lines 59 – 62 wherein the plurality of gate lines are formed from a first metal layer. Fukuda discloses in figures 1 and 2 and column 6, lines 41 – 50 the plurality of data lines are formed from a second metal layer such that the data lines are located above the first metal layer. Fukuda and Kunikiyo do not disclose what materials comprise a sensor. Antonuk teaches in figures 1 and 2 and column 9, lines 51 – 59 wherein each of a plurality of pixel circuits (50) also comprises a sensor including an amorphous silicon layer (30) formed on a metal plate (22), and wherein the metal

plate is formed from a third metal layer formed after a first (14) and second (54) metal layers. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the sensor and metal plate of Antonuk in the device of Fukuda and Kunikiyo in order to use a sensor that will achieve real-time diagnostic x-ray radiographic images with immediate presentation after the irradiation without the need to wait for film development or laser scanning of a photostimulable phosphor plate as taught by Antonuk in column 6, lines 18 – 22. It should be noted that "a third metal layer formed after the first and second metal layers" is a product by process limitation which bears no patentable weight in a device claim.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lampe et al., Sasaki, Nathanson et al., Hornbeck, Buynoski, and Berry et al. all disclose using air as an insulator between two overlapping metallic lines. Mulato discloses a thin film transistor sensor array.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul E Brock II whose telephone number is (703)308-6236. The examiner can normally be reached on 8:30 AM-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703)308-1690. The fax phone numbers for the

organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Paul E Brock II
November 15, 2002

EDDIE LEE
SUPERVISORY PATENT EXAMINER
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